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APPRENTICESHIP TRAINING

CARPENTER Program

Alberta

MANPOWER

Apprenticeship and Trade
Certification Division

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CARPENTER TRADE

THE GOAL OF APPRENTICESHIP TRAINING

To develop a competent tradesman who, through skill and knowledge, is capable of building all types of structures.

THE PRODUCT OF APPRENTICESHIP—
a graduate who will:

- * Understand the principles of sound and safe construction.
- * Know the characteristics and proper use of all building construction materials.
- * Read blueprints, do layout work and calculate quantities of materials.
- * Build various types of forms for concrete.
- * Build all types of wood framed buildings and apply exterior and interior finish of wood or wood substitute.
- * Be proficient in the safe use and maintenance of hand and power tools.
- * Be familiar with the work of other tradesmen in the building industry.
- * Perform assigned tasks in accordance with quality and production standards required in industry.

CARPENTER APPRENTICESHIP INFORMATION

Basic Requirements:

- * Indenture for four periods of Trade experience.
- * Attend an eight week technical training course in the first, second, third and fourth periods.
- * Fulfill the requirements for each period including 1600 hours of work experience inclusive of time spent at the training course; successfully complete the technical training course and obtain a satisfactory employer's report.
- * Education — a minimum requirement is the completion of grade 9 or a pass on an equivalent entrance examination as prescribed by the Trade regulation.
- * Age — the minimum age for apprentices is 16 years. There is no upper age limit.

Credits:

- * Accelerated patterns of apprenticeship may be granted for related technical training and/or experience.

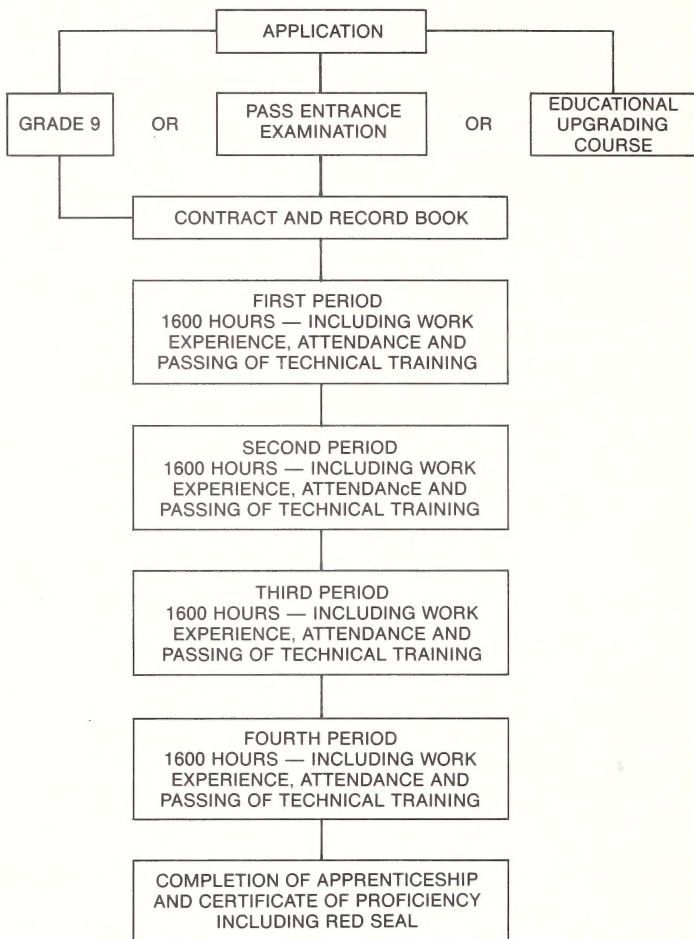
Benefits:

- * Apprenticeship is a learning-while-earning program. During the apprenticeship period, while working at the trade, apprentices are assured by regulation of a minimum percentage of the prevailing journeyman rate: 60% during the first period, 70% during the second period, 80% during the third period, 90% during the fourth period. Progress from one rate to the next takes place only after successful completion of all the requirements for each period (details are outlined in the Record Book).
- * All apprentices 17 years of age and older are normally eligible for training allowances while attending technical training courses. These allowances are funded by the Canada Employment and Immigration Commission.
- * Administrative procedures establishing the amount of training allowance is complex and can vary with an individual's circumstances. Contact a local Canada Employment Centre for details.
- * An apprentice who successfully completes the program will graduate with an Alberta Completion of Apprenticeship Certificate and a Certificate of Proficiency. It is also possible for the graduate to obtain an interprovincial Red Seal by passing an additional examination and so become recognized as a qualified tradesman throughout Canada.
- * The most significant benefit to the graduate apprentice is that he is well trained in technical and practical aspects of the trade and is able to make a worthwhile and productive contribution to society. Society in return, will provide an opportunity for livelihood.

DIRECTIONS FOR PROSPECTIVE APPRENTICES

- * Contact your nearest Apprenticeship and Trade Certification Division for detailed information and counselling (see list of offices on page 55).
- * Obtain an application form from the Apprenticeship and Trade Certification Division and neatly complete, in full, the information requested of the apprentice.
- * Persevere in the search for apprentice employment and upon obtaining employment, give the application to the employer. It should be completed and returned to an Apprenticeship and Trade Certification Division forthwith.
- * Any time credit, for previous experience in the Carpenter trade, should be discussed with the employer and requested on the application forms by the employer.
- * Prepare to be called for an entrance examination following submission of your application. You will be advised of the date, time and location.
- * A contract of apprenticeship is entered into between the apprentice and the employer and should be signed within 90 days after the apprentice application has been approved. If contracts have not been issued within this time, contact the Apprenticeship and Trade Certification Division.
- * Before signing the contract of apprenticeship read the complete document carefully — know your obligations and responsibilities to your employer — know the employer's obligations and responsibilities to you — feel confident you have selected the right occupation.
- * Know when you will be expected to attend classes and be prepared to attend. In early May of each year, School Schedules are sent to you and your employer. The employer also receives a class selection card for you, which is to be completed and submitted for scheduling. Information on procedures also accompanies the above. Confirmation on the date you actually get scheduled and/or the Official Notice will follow at the appropriate time(s).
- * Prepare in advance for the financial obligations required of you during school training. Reference materials and school supplies are paid for by the apprentice.
- * While an apprentice, it will be your responsibility to respond promptly to mailed directions and requests from the Apprenticeship and Trade Certification Division.

APPRENTICESHIP ROUTE TOWARD CERTIFICATION



APPRENTICESHIP COMMITTEE STRUCTURE

Carpenter Provincial Apprenticeship Committee

The Provincial Apprenticeship Committee for the Carpenter Trade is comprised of members from Local Apprenticeship Committees from the cities of Edmonton, Calgary, Fort McMurray, Grande Prairie, Lethbridge, Medicine Hat, Red Deer and Vermilion.

This Committee is concerned with the policies that guide the program and make recommendations to the Apprenticeship and Trade Certification Division and the Director of the Apprenticeship and Trade Certification Division in the following areas:

- * Contribute current information relative to changes in the trade and requirements of industry.
- * Make recommendations for changes to existing trade regulations.
- * Assist in updating of the training program through recommendations for revisions to the course outline and attendant examinations.

Carpenter Local Apprenticeship Committee

Local Apprenticeship Committees are concerned with individuals and trade situations within a local region. Meetings are held throughout the year to make recommendations and to discuss problems relating to the apprenticeship program. Members who serve on committees are nominated by employer and labour organizations, and membership is equally divided into employer and employee representation in accordance with The Manpower Development Act.

Apprenticeship Committee Members:

Mr. J. Yurchevich — Calgary — Employer
Mr. A. Olson — Calgary — Employer
Mr. J. Pepper — Calgary — Employer — Alternate
Mr. J. Paterson — Calgary — Employee
Mr. O. Fletcher — Calgary — Employee
Mr. M. Piper — Calgary — Employee — Alternate
Mr. D. Otto — Edmonton — Employer
Mr. R. Anderson — Edmonton — Employer
Mr. M. Semchuk — Edmonton — Employee
Mr. A. Curtis — Edmonton — Employee — Alternate
Mr. D. Langley — Edmonton — Additional Marker
Mr. A. Kinasevich — Edmonton — Additional Marker
Mr. R. Neufeld — Fort McMurray — Employee
Mr. M. Lord — Fort McMurray — Employee
Mr. R. Castonguay — Fort McMurray — Employee
Mr. D. Kootenay — Fort McMurray — Employer
Mr. A. McEwen — Grande Prairie — Employer
Mr. J. Turner — Grande Prairie — Employer — Alternate
Mr. H. Jantz — Grande Prairie — Employee
Mr. J. Cadieux — Grande Prairie — Employee — Alternate
Mr. A. Simons — Lethbridge — Employer
Mr. J. Bane — Lethbridge — Employer
Mr. H. Ward — Lethbridge — Employer — Alternate
Mr. R. Coyle — Lethbridge — Employee
Mr. V. Cederberg — Lethbridge — Employee
Mr. C. Pankhurst — Lethbridge — Employee — Alternate
Mr. J. Ens — Medicine Hat — Employer
Mr. E. Klose — Medicine Hat — Employer
Mr. W. Konrad — Medicine Hat — Employee
Mr. L. Rebman — Medicine Hat — Employee
Mr. U. Wunsch — Red Deer — Employer
Mr. A. Grieb — Red Deer — Employer
Mr. F. Battensby — Red Deer — Employee
Mr. R. Dach — Vermilion — Employer
Mr. R. Swyripa — Vermilion — Employer — Alternate
Mr. R. Oldenburg — Vermilion — Employee — Alternate

CARPENTER PROGRAM COURSE OUTLINE

This outline has been prepared in accordance with recommendations from the Provincial Apprenticeship Committee for the Carpenter Trade in the Province of Alberta.

The outline was updated following consideration given to recommendations and suggestions from:

- Local Apprenticeship Committees
- Representatives from training institutes
- Curriculum Sub-Committee from the Provincial Apprenticeship Committee

PROCEDURES FOR RECOMMENDING REVISION(S) TO THE COURSE OUTLINE

Any concerned citizen or group in the Province of Alberta may make recommendations for change by writing to Apprenticeship and Trade Certification Division, Edmonton.

It is requested that recommendations for change refer to specific areas and state references used. Recommendations received will be placed before regular meetings of the Provincial Apprenticeship Committee.

PREFACE

The lectures, demonstrations and assignments outlined herein, are intended to familiarize and to prepare the Carpenter apprentice for the best possible performance of his occupation within the construction industry. To fulfill present day requirements and to become able to adjust to situations that will arise apart from nominal work experience during apprenticeship, it is accepted that the apprentice should appreciate and develop skills within the scope of the industry.

SHOP

The areas and projects outlined in shop sections are designed to range from introduction to tools, equipment, safety and the development of skills, to simulated construction problems encountered in industry.

THEORY

The areas outlined in the theory sections are designed to introduce or buttress and more sharply define the subject matter. When impractical for shop exercises, some areas will be taught in theory only.

BLUEPRINTS

This area of outline is designed to enable the apprentice to become able to envision, build and assemble from drawings and blueprints. He should learn to develop and transmit basic concepts to others within the industry.

TRADE MATHEMATICS

Basic Mathematics is essential for the Carpenter. Measuring for layouts, cutting of materials and calculations of areas and quantities are routine requirements of a tradesman. Instruction and participation in exercises shall relate to theory and shop assignment that are outlined.

GENERAL

A cursory glance at the outline reveals a new language or glossary to the uninitiated. The Apprenticeship and Trade Certification Division has stipulated that the areas outlined shall be taught within their relationship to the Carpenter trade and the depth of instruction and participation will be governed accordingly. Hours have been assigned to instruction. The hours stated are for guidance and not intended as a firm rule. Adjustments in time may be made for rate of apprentice acceptance, statutory holidays and Institute and Apprenticeship and Trade Certification examinations.

SAFETY EDUCATION

Safe working procedures and conditions, accident prevention and the preservation of health is of primary importance in the Apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of the government, employers, employees and the general public. Therefore, it is imperative that all parties become aware of circumstances that may lead to injury or harm and that safe learning experiences and environment can be created by controlling the variables and behaviors that may contribute to or cause an accident and/or an injury.

It is generally recognized that a safe attitude contributes to an accident free environment. As a result a healthy safe attitude towards accidents will benefit an employee by helping to avoid injury, loss of time and loss of pay.

A tradesman is possibly exposed to more hazards than any other person in the work force and therefore, should be familiar with the Occupational Health and Safety Act and Regulations dealing with his own personal safety and the special safety rules applying to each job.

LEGAL AND ADMINISTRATIVE ASPECTS

Employer's Responsibilities:

Accident prevention and the provisions of safe working conditions are the responsibilities of an employer. The company is responsible for:

1. The provision and maintenance of safety equipment
2. The provision of protective devices and clothing (as required by the Occupational Health & Safety Act, General Safety Regulations)
3. The enforcement of safe working procedures
4. Adequate safeguards for machinery, equipment and tools
5. Observance of all accident prevention regulations

Government's Responsibilities:

The Apprenticeship and Trade Certification Division in conjunction with the respective Provincial Apprenticeship Committee assumes the responsibility to assure that adequate safety is reflected in the curriculum and that adequate safety instruction is presented at the training establishments.

The Occupational Health and Safety Inspection Branch assumes the responsibility for periodic inspection of the operation to ensure that regulations for industry are being correctly observed.

Individual's Responsibilities:

The employee is responsible for:

1. Knowing and working in accordance with the safety regulations pertaining to job environment and
2. Working in such a way as not to endanger himself or his fellow employees

The major factor in safety is the individual employee, his personal attitude toward safety and having an awareness of the respective safety regulation.

CARPENTER PROGRAM

Subjects and Time Distribution

First Period	8 Weeks	30 Hours Per Week	240 Hours	Page
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Section Two:	Shop		120	18
Section Three:	Shop Drawing		32	21
Section Four:	Trade Mathematics		32	21
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Section Three:	Shop Drawing		24	52
Section Four:	Trade Mathematics		56	53

FIRST PERIOD TECHNICAL TRAINING

SECTION ONE: 56 Hours

A. Introduction 3 Hours

1. Program orientation
 - (a) attendance and deportment
 - (b) reference books, study methods
 - (c) Apprenticeship and Certification Division Liaison Officer
2. The construction industry
 - (a) role of Federal, Provincial and Municipal authorities
 - (i) codes
 - (ii) inspections
 - (b) scope of the Carpenter trade
 - (i) light, commercial and industrial construction

B. Materials of Construction 8 Hours

1. Review of solid woods in common usage
 - (a) recognition and classification
 - (i) hard-soft
 - (ii) regions grown
 - (iii) commercial values
 - (b) properties of various types
 - (i) densities
 - (ii) grains, workability
 - (iii) structural — aesthetic qualities
 - (c) grades
 - (i) range of dimensions
 - (ii) special orders
 - fire retardant types
 - (iii) flaws — defects related to growth or sawmills
 - wanes, burns
 - rot, knots, etc.
 - (d) seasoning — storage
 - (i) moisture contents
 - air drying
 - kiln drying
 - (ii) shrinkage
 - (iii) — flaws — defects related to improper storage
 - rot, warpage, raised grains, checks, etc.
2. Review of other wood materials
 - (a) plywoods, chipboards, particle boards, composition boards
 - (i) method of manufacture — classifications
 - (ii) range of dimensions
 - (iii) typical usage
 - (iv) structural aesthetic qualities
 - (v) storage — handling

- (b) prefinished types
 - (i) vinyl overlays
 - (ii) melamine overlays
 - (c) surface veneers of various plywoods
 - (i) sliced and rotary cuts
 - (ii) typical thickness
 - (iii) typical cores
3. Review of wood mouldings — joints
- (a) standard mouldings
 - (i) recognition and range of sizes
 - (ii) common usage
 - (iii) typical joints for installation
 - butt
 - mitre
 - cope
 - (b) joints for fabrication
 - (i) recognition and common uses
 - butt
 - rabbet
 - mitre
 - middle, end and crosslap
 - dado
 - groove and spline
 - tongue and groove
4. Other common materials
- (a) introduction for purposes of recognition and review of usage in industry
 - (i) metal products in exterior and interiors of buildings
 - flashing
 - studs, channels
 - extruded trim, etc.
 - (ii) normal portland cements — aggregates
 - concrete — range of compressive strengths
 - cement types
 - (iii) plastics
 - membranes
 - laminates
 - solids
 - (iv) — below grade insulation
5. Fasteners
- (a) review of general purpose fasteners used in industry
 - (i) nails, screws, bolts, staples
 - gauges, lengths
 - coatings
 - (ii) general purpose glues and adhesives
 - strengths achieved
 - curing periods

C. Handtools

3 Hours

1. Recognition, the proper use and maintenance of tools
 - (a) measuring, layout and alignment tools
 - (b) squaring, marking tools
 - (c) cutting tools
 - (i) edge
 - (ii) tooth
 - (d) boring, drilling tools
 - (e) securing, assembly tools
 - (f) prying, dismantling tools
 - (g) sharpening
 - (i) vises, clamps, saw sets
 - (ii) stones files, lubricants, etc.
 - (h) sandpapers and abrasives
 - (i) compositions and grits
 - (ii) selection for various operations
2. Components of a typical tool kit
 - (a) layout, forming, framing and finishing jobs

D. Machines and Powered Hand Tools

3 Hours

1. A comprehensive review of woodworking machines and powered hand tools with emphasis on safe operations
 - (a) table saw
 - (b) radial arm saw
 - (c) hand electric saw
 - (d) chain saw
 - (e) jointer
 - (f) planer
 - (g) grinders
 - (h) sanders
 - (i) cut-off saws
 - (j) light and heavy duty drills
 - (k) pneumatic nailing equipment
 - (i) identification and purpose of parts
 - (ii) range of job applications
 - (iii) typical locations, accessibility on sites
 - (iv) available accessories
 - extensions
 - simple jigs
 - (l) wood and abrasive cutting blades

E. Occupational Health and Safety Regulations

4 Hours

1. Information given in the regulations will be stressed as course material is taught. Regulations will be observed in shop exercises.
2. Study of the regulations
 - (a) first aid regulations
 - (b) general accident prevention regulations with emphasis on

- (i) general safety precautions
 - (ii) housekeeping, personal protective equipment, clothing
 - (iii) guards
 - (iv) grinding
 - (v) rigging
 - (vi) woodworking — general, saws — general, hand-fed, cross and rip saws
 - (vii) non-kickback devices
 - (viii) portable hand-operated saws
 - (ix) hand-fed planers and jointers
- (c) construction safety regulations with emphasis on
 - (i) use of safeguards
 - (ii) ladders
 - (iii) protection from falling materials
 - (iv) safety belts, life lines, safety nets
 - (v) scaffolds — general, half horse, bracket, pole, rolling, power lift
 - (vi) scaffolds — swing stage, suspended
 - (vii) floor and roof openings, perimeter guardrails
 - (viii) temporary floors, temporary supporting structures
 - (ix) excavations, trenching
 - (x) chain saws
- 3. Fire prevention and controls
 - (a) types of fires
 - (b) types of extinguishers
 - (c) critical areas in construction
 - (d) prevention and safety
- 4. Other Concerns
 - (a) emergency procedures — obtaining assistance for injured workmen
 - (b) procedures for obtaining first aid training — certification
 - (c) industrial health hazards
 - (i) fumes and skin contact with toxic substance
 - (ii) noise
 - (iii) vibrating tools

F. Machines and Equipment

3 Hours

1. Discussions on equipment used in light and heavy construction for general awareness of types, capacities for expediting work loads
 - (a) excavating, trenching, compacting, backfilling
 - (b) levelling, grading
 - (c) concrete placement and consolidation
 - (i) tremies, trowels, vibrators, etc.
 - (d) hoisting — tower and mobile cranes
 - (i) ropes, chains, slings, cables
 - (ii) shackles, hooks, knots
 - (iii) signal systems
 - (iv) occupational health and safety regulations

G. Building Operations

10 Hours

1. Elementary introductions
 - (a) legal survey — bylaws, permits
 - (b) blueprints — orientation on site or plot
 - (c) location and elevation of utilities
 - (d) soil testing — bearing capacities
 - (i) water tables — frost levels
 - (e) excavating — soil removal, storage
 - (i) angle of repose
 - (ii) retaining systems
 - (f) accommodation for material flow
 - (g) power (electricity) sources
2. Site layout
 - (a) batter boards — building lines
 - (i) squaring by 3-4-5 method
 - (ii) squaring by diagonal method
 - (iii) bench mark
 - (iv) elevations
 - (b) excavation lines
 - (i) establishing approximate levels during excavation
 - (ii) depth of cut
 - (iii) removal and storage of soils
3. Introduction to levelling systems
 - (a) establishing levels with
 - (i) transit — builder's level
 - (ii) spirit level and straight-edge
 - (iii) hydro level
 - (iv) laser level
4. Introduction to natural and built in forces on buildings and theory of load transmissions
 - (a) vertical live and dead loads (wind, snow, mass, gravity, etc.)
 - (i) typical members in compressions — footings, walls columns, etc.
 - (ii) importance of plumb or alignment to loads by supporting members to avoid deflections, tensions, etc.
 - (b) lateral forces
 - (i) typical members for compensation
 - partitions, floors and roofs
 - pilasters, buttresses, etc.
 - (c) importance of proper connections, design, etc. to counter known and anticipated forces

H. Forming

16 Hours

1. Footings
 - (a) relating building lines to bottom of excavation
 - (b) layout and design of footings for wall forms and bearing partitions (including stepped types)

- (i) sharpening and setting stakes
 - (ii) levelling, squaring and alignment procedures
 - (iii) spanning disturbed soil (trenches)
 - (iv) considerations for fill under slab
 - (v) considerations for lateral pressures (concrete)
 - (vi) placement of keyways
 - (vii) consideration for placements of reinforcement
 - horizontal and vertical steel
 - anchor bolts, the use of templates
 - (c) layout and design of footings for columns, posts
 - (i) material, hardware
 - (ii) stepped, box types
 - (iii) templates and anchor bolts
 - (d) piles
 - (i) purpose and types
 - augered and poured-in-place
 - set and driven
 - (e) grade beams
 - (i) purpose and types
 - (ii) consideration for frost heaving
 - (f) simple slabs
 - (i) basement floors
 - (ii) surface (grade) slabs
 - sidewalks, driveways, etc.
 - typical thicknesses, control joints
 - curing
 - forming curved — irregular perimeters
 - (iii) slabs combined with piles
 - grade beams
 - slab stiffeners
2. Wall forms
- (a) materials
 - (i) structural concrete
 - (ii) architectural concrete
 - (b) hardware
 - (i) a review of types of ties, brackets, inserts, clamps, banding devices, etc. used in today's industry
 - (c) release agents, coatings used for forms
 - (d) built-in-place systems
 - (i) considerations for lateral (hydrostatic) pressures
 - (ii) spacing of supports
 - (iii) corner construction — bracing
 - (iv) walers and strongbacks
 - (v) hardware
 - ties, wedges, rods, spreaders, etc.
 - (vi) special considerations
 - installation of bucks, bulkheads
 - beam pockets and provisions for bearing
 - pilasters

- (vii) alignment, square and level checks
 - establishing finish elevations below top of forms
- (viii) stripping procedures
- (e) prefabricated systems
 - (i) types — panel sizes
 - (ii) assembly jigs
 - (iii) protective coatings and release agents
 - (iv) hardware — wood or metal walers
 - (v) erection, alignment and bracing
 - (vi) stripping procedures
- (f) preserved wood foundations
 - (i) general information on system
 - types of footings
 - studs — spacing
 - sheathing materials
 - preservatives — sealants
 - alignment procedures
- (g) considerations before backfilling
 - (i) lateral pressures — bracing
 - (ii) moisture proofing
 - (iii) systems and materials used for drainage
 - weeping tile, perforated plastic types

I. The Floor Frame

6 Hours

1. A review of procedures for a typical residential unit
 - (a) anchorage to foundations
 - (i) cast-in-place systems
 - (ii) sills and anchor bolts
 - (b) steel beams
 - (i) attaching wood members
 - pads, ledgers
 - (c) built-up beams
 - (i) typical construction
 - relating joints to posts or supports
 - (d) posts for beam support
 - (i) types of footings required
 - (ii) wood or pipe — adjustable screw types
 - (iii) crowns — camber of beams
 - (e) bearing partitions
 - (i) typical layout
 - (ii) separating wood from concrete below grade
 - (f) floor joists
 - (i) dimensions — spacing, spans
 - (ii) typical layouts with emphasis on accommodating
 - load bearing and non load bearing partitions and walls
 - stacks — bathroom fixtures
 - chimneys — fireplaces
 - stair openings

- (iii) special connectors — supports
 - hangers, ledgers, etc.
- (iv) truss joist
 - types
 - layout
- (v) introduction to insulation and air/vapour barriers at joist line
- (g) bridging
 - (i) types — installation procedures
- (h) subflooring
 - (i) types
 - (ii) application procedures
 - spacing of nails — fasteners
 - causes of “squeaking” floors
 - (iii) application on concrete floors

SECTION TWO:

SHOP

120 Hours

Objectives:

The shop operations will relate to items outlined in theory sections. Safety regulations will be observed.

A. Hand Tool Operations

32 Hours

1. Skill development
 - (a) hand tools of all types in projects of wood materials
 - (i) solid woods, plywoods, chip and particle boards
 - (ii) practice with making — fitting joints of wood
 - (iii) practice with fitting of mouldings
 - (iv) marking and cutting of metal and plastics
 - (v) gluing, clamping and layup
2. Reconditioning of hand tools
 - (a) tools that are used will be maintained in top working condition by apprentices

B. Woodworking Machines and Powered Hand Tools

30 Hours

1. Practice exercises in safe use of machines and tools listed in theory
 - (a) set up procedures
 - (b) versatility — range of equipment use
 - (i) accessories — simple jigs
 - (ii) coping with bowed, warped stock
2. Selected shop projects that incorporate the use of a variety of machines and construction materials.

C. Rigging

6 Hours

1. Demonstration and practice with slings and hitches used for preparing and lifting material components and packages.
 - (a) practice with knots and hitches
 - (i) load tests

- (b) demonstrations of proper use and location of chokers and slings on loads for lifting
- (c) practice with accepted signals to operators of lifting equipment

D. Explosive Actuated Tools Course

6 Hours

1. Objectives — this course is designed to provide
 - (a) instruction in safety
 - (b) instruction in uses and applications
 - (c) instruction in care, maintenance and operation
 - (d) practical experience in firing
2. Theory
 - (a) types of tools, fasteners, charges. High velocity and low velocity tools. How tools operate and why. Safety features in design of tools. The different type of fasteners and charges. Safety codes and regulation. Causes of misfire.
 - (b) application — operator's responsibility. Direction from superiors a part of safe operation. Relationship between pins, charges and materials. Hidden features of fastening surfaces.
3. Practical
 - (a) servicing and storage of tools and supplies. Demonstration of minimum service of all common tools. Major service responsibility of supplier. Proper and safe storage of tools and charges. Disposal of misfired charges.
 - (b) operation (demonstration). Demonstration of the actual firing of a high velocity tool and a low velocity tool
 - (c) operation (participation)
 - (i) prefiring routine:
 - check proper personal protection
 - check work surface — visible and invisible
 - check loading of the tool
 - check surroundings — "Is it safe to fire?"
 - (ii) firing — each student to load and fire
 - high velocity type
 - low velocity explosive actuated type
4. Test — as designed by the training institute training the course.
5. A Certificate of Proficiency will be issued on successful completion of the course.

E. Layout and Elementary Form Work

36 Hours

1. Demonstrations and practice with procedures used to establish excavation lines and building perimeters from given reference points
 - (a) construction and bracing of batter boards
 - (b) squaring with diagonal and 3-4-5 methods
 - (i) attaching lines, wires
2. Demonstration and practice with footing forms
 - (a) transfer of building lines to bottom of excavation

- (b) making and driving stakes
 - (c) constructing footings for wall forms
 - (i) rectangular, "T" or "L" shaped perimeters
 - (ii) squaring, levelling, alignment and bracing
 - (iii) keyways
3. Demonstrations and practice with forms for columns, posts and bearing partitions.
- (a) stepped types
4. Demonstrations and practice with layout and erection of wall forms
- (a) built-in-place
 - (b) prefabricated panels
 - (i) various types of hardware, ties
 - (ii) pilaster, beam pocket considerations
 - (c) typical fabrication — installation procedures for items
 - (i) bucks
 - (ii) bulkheads
 - (iii) window units
 - (iv) reinforcement
 - (d) establishing elevations — wall heights
 - (i) ledgers, shims for cast in place joist systems
 - (ii) provisions for sills on concrete — anchor bolts
5. Demonstration or practice with layout, setting forms, pegs and screeds for concrete slabs above or below grades
- (a) basement floors, grade slabs, sidewalks
 - (i) elevations, slopes
 - (ii) control joints
 - (b) base preparations — considerations
 - (i) height and compacting of fill
 - (ii) moisture barriers
 - (c) practice with forming rounded or circular slabs
 - (i) various radii

F. Floor Framing

10 Hours

1. Practical projects designed to demonstrate methods for joist layouts on bearing partitions, beams
- (a) considerations for loads — other trades
 - (i) bearing and nonbearing partitions
 - (ii) floor openings
 - (iii) plumbing stacks and fixtures
 - (iv) fireplaces
 - (b) preparations for subfloor
 - (i) checking alignment — crowns of joists
 - (ii) bridging systems
 - (iii) application systems — fasteners and adhesives used for various materials — common boards, T & G, plywoods

- (c) procedures to correct shallows or crowns that can occur after subfloor has been applied

SECTION THREE:

BLUEPRINTS

32 Hours

A. Introductions

1. Language of drawings
 - (a) object, extension, centre, hidden and break lines
2. Practice with drawing instruments
 - (a) lines
 - (b) numbering

B. Freehand Sketching

1. Simple drawings of trade symbols
2. Basic drawings as an aid in understanding glossaries

C. Drawing Specifications

1. Basic orthographic and isometric presentations
2. Plan and elevation views for shop projects

D. Blueprint Interpretation

1. Study of residential and light commercial blueprints for appreciation of typical presentations
 - (a) site, plot
 - (b) plan, elevation and section views
 - (c) room finish schedules
2. Isolating items for other trades; correlating job assignments examples.
 - (a) Bricklayers — footings, bucks, frames, etc.
 - (b) Electricians, Plumbers and Sheet Metal — sleeves, access openings, etc.
3. Assigned problem solving arising from study of blueprint

SECTION FOUR:

TRADE MATHEMATICS

32 Hours

A. Placement Test

Objectives:

This section of training is intended to permit the apprentice to partake in remedial or accelerated exercises at the discretion of the instructors.

B. Calculations Related to Trade Practices

1. Basic Operations
 - (a) whole numbers, fractions and decimals
 - (b) percentage
2. Basic Units and derived units of S.I. (systems international)
3. Linear measurements
 - (a) square, rectangular and circular shapes
 - (b) irregular (geometric) shapes
4. Area
 - (a) square, rectangular and circular shapes
 - (b) irregular (geometric) shapes
5. Volumes — capacities
 - (a) compartments, bins, excavations, forms, etc.
6. Proportions — percentages
 - (a) fasteners and glue for areas
 - (b) loss related to shrinkage and waste allowance, etc.
7. Material quantities related to study of plans, drawings
 - (a) general — scaffolding, equipment use and repair
 - (b) milling, spoilage and waste allowances
 - (c) cutting lists for specified projects

SECOND PERIOD TECHNICAL TRAINING

SECTION ONE:

THEORY

56 Hours

A. Registration and Review

1. Registration
 - (a) program orientation
 - (b) reference materials and supplies
2. Selective review of first period training

B. Framed Structures

6 Hours

1. Design
 - (a) a study of framed structures for appreciation of imposed and anticipated forces and stresses
 - (b) the importance that tradesmen play through fidelity to specifications, details
2. Review of applicable codes
 - (a) span tables
 - (b) types and spacing of fasteners, etc.
3. Comparison of framing systems
 - (a) western platform
 - (b) balloon
 - (c) post and beam
 - (d) plank wall
4. Walls and partitions of wood
 - (a) plate layout for exterior walls
 - (i) relating to door and window dimensions
 - (ii) room heights — length of studs and spacing
 - (iii) corner construction — intersecting partitions
 - (iv) wall openings
 - (v) introduction to energy efficient construction
 - (b) assembling and erecting
 - (i) squaring and aligning for sheathing
 - (ii) exterior finish considerations
 - backing for vertical siding
 - backing for interior fixtures, etc.
 - (iii) sheathing application
 - (iv) erecting and temporary bracing procedures
 - (v) considerations for multistorey buildings
 - (c) layout and erection of interior partitions
 - (i) consideration for typical and special doors and door units
 - passage
 - pocket
 - bypassing
 - bifold and folding

- (ii) consideration for other items
 - laundry chutes, chimneys, etc.
 - girts, fire shops, etc.
 - sound transmission
- (iii) consideration for other trades
 - fireplaces
 - bathroom fixtures
 - heating systems
 - backing for finish materials and units
- (iv) erecting, aligning and bracing procedures

C. Other Walls and Partitions

4 Hours

1. Metal stud partitions
 - (a) bearing and nonbearing systems
 - (i) floor and ceiling runners
 - (ii) securing systems to various materials
 - (iii) corner and intersecting wall considerations
 - (iv) framing for door and other access openings
 - (v) internal, lateral bracing procedures
 - (vi) accessories — corner beads, wall angles, clips and bars, etc.
 - (vii) fire rating
2. Horizontal and vertical application of gypsum boards
 - (a) patterns for butt joints
 - (b) selection and location of screws
 - (c) laminated systems
 - (i) backing boards
 - (ii) strip systems
3. Setting metal frames
 - (a) levelling, plumbing and securing
4. Prefabricated partitioning systems
 - (a) applications — where used
 - (i) sound transmission
 - (b) types — finishes
 - (i) components and erection systems
 - (ii) installation of doors, glass units, etc.

D. Ceiling Joists

2 Hours

1. Layout for gable and hip roof systems
 - (a) dimensions, spacings, spans
 - (b) butted or lapping
 - (c) incorporated as flush or dropped beams
 - (d) considerations for roof slopes
 - (i) wood over plates
 - (ii) stub types for hip roofs
 - (e) strong backs — ribbons
 - (f) integrating and backing parallel partitions
 - (i) access openings

1. A comparison study of framed roof systems
 - (a) flat
 - (b) shed
 - (c) gable
 - (d) hip
 - (e) hip and valley
2. Roof design considerations
 - (a) rise
 - (b) run
 - (c) overhang
 - (d) allowable spans
 - (e) ridge boards
 - (f) lookouts
 - (g) barge boards
 - (h) cornices
3. The gable roof
 - (a) framing square applications
 - (i) line lengths
 - shortenings
 - (ii) plumb and level cuts
 - bird-mouths
 - tails
 - (iii) collar ties — barge boards, etc.
 - (b) cutting and erection procedures
 - (i) with and without ridge boards
 - collar ties
 - sheathing
 - (c) gable ends
 - (i) built-in-place
 - (ii) prefabricated and raised in place
 - vents, louvres
 - (iii) other considerations
 - backing for interior finishes, etc.
 - (d) sheathing — exterior finish
 - (e) consideration at wall line for
 - insulation
 - air/vapour barriers
4. Cornice details (wood, metal and vinyl)
 - (a) flush systems (without soffits)
 - (b) boxed eaves
 - (i) soffits
 - (ii) fascia
 - (iii) frieze boards
 - (iv) barge boards
 - (c) built-in-place and prefabricated systems
 - (i) auxiliary venting
 - (ii) cornice returns

5. Light trusses

- (a) study of typical trusses used in "light" construction
 - (i) Fink or W Truss
 - (ii) Howe or King post truss
 - spans and spacing
 - members in tension and compression
- (b) fabrication and erection procedures for other roof units
 - (i) combining trusses with built-in-place rafters
 - (ii) fabrication and erection of rigid frame members
 - (iii) fabrication and erection of arch ribs
- (c) sheathing
 - (i) grades and types — joint patterns
 - (ii) fasteners — types and spacing
 - (iii) considerations for eavestroughing
- (d) considerations for roof openings
 - (i) vents
 - (ii) chimneys, etc.

F. Shingles — Roofing

3 Hours

1. A review of materials and systems

- (a) built up roofing
- (b) rolled roofing
- (c) cedar shingles
 - (i) shakes
- (d) asphalt
 - (i) low slope
- (e) tile and slate
- (f) metal

2. Review of application procedures

- (a) papers, felts, rigid insulations
 - (i) starter shingles
 - (ii) exposures to weather
 - (iii) flashing systems
 - nails or fasteners

G. Insulations, Building Papers, Air/Vapour Barriers

4 Hours

1. Recognition of insulations — typical usage in industry

- (a) blanket — batt
- (b) rigid
- (c) loose-fill
- (d) foamed-in-place
- (e) reflective

2. Theory of heat transfer and loss

- (a) acoustic values
 - (i) review of installation — application procedures

3. Recognition and purpose of vapour barriers

- (a) moisture content and levels in buildings and materials

- (b) problems related to moisture penetrations
 - (i) installation — application procedures
 - repair of punctures
- 4. A review of papers and felts used in industry
 - (a) weights, laps, etc.
- 5. Energy Efficient Construction
 - (a) basic introduction

H. Wood and Metal Doors

4 Hours

1. Recognition of door types — ranges of sizes and common usage
 - (a) solid and hollow cores
 - (b) panelled
 - (i) glazed units
 - (ii) combined with frames with side panels, lights
 - (iii) fire rated
 - (iv) overhead
 - (v) sliding (patio)
 - (vi) custom designed (architectural)
 - churches, commercial establishments
2. Exterior and interior door frames
 - (a) rabbetted
 - (b) with door stop
 - (i) sills for exterior units
 - (c) frames for special units
 - (i) overhead
 - (ii) pocket, folding, etc.
 - (d) fabrication and installation of frames
 - (i) swing of door, clearance
 - (ii) weather seals, flashing
 - (iii) trims — casings
 - thresholds, astragals, etc.
3. Hardware for doors
 - (a) hinges
 - (b) hangers, rollers
 - (i) grips, cups, edge pulls, etc.
 - (c) latch and locksets
 - (i) magnetic hold openers and lock systems
 - (d) closers, bars, push plates
 - (e) special security items
 - (i) bolts, bars, dead locks, etc.
4. Hanging of doors and installation of hardware
 - (a) use of door bucks to plane (size) doors
 - (b) use of simple templates and jigs for hardware installation
 - (c) coping with moderate crowns, bows
 - (d) adjustment to previously hung doors
 - (i) settling of buildings, moisture absorption, etc.
 - (e) installation of prehung door units

I. Windows

2 Hours

1. Recognition of typical wood, vinyl and metal types
 - (a) checkrail
 - (b) sliding
 - (c) casement
 - (d) awning
 - (e) sealed units
 - (i) skylights, etc.
 - (f) accessories
 - (i) screens, inserts for style, etc.
 - (g) study of special (architectural) units
 - (i) T bars, mullions, etc.
 - (h) relating glass to floor areas
 - (i) installation procedures for glass into openings
 - (i) installation of window units

J. Exterior Finish

4 Hours

1. Review of exterior finishes for residential and light commercial construction
 - (a) wood
 - (i) bevelled
 - (ii) shakes/shingles
 - (iii) V joint
 - (iv) panels
 - (b) treatments — coatings for plywood and siding
 - (c) other siding
 - (i) vinyl
 - (ii) metal
2. Application procedures
 - (a) building papers — starting strips
 - (b) layout of courses
 - (i) internal and external corner considerations
 - (ii) flashing — sealants
 - (c) feature panels
 - (i) provisions for expansion
 - (ii) battens — sealants, etc.
3. Relating to other finishes
 - (a) stucco
 - (b) brick veneer
 - (i) review of carpenter roles
 - footings, ledgers, etc. for brick
 - drip caps, dividers, frieze boards, etc.

K. Introduction to Wood Stairs

10 Hours

1. Review of basic wood stairs
 - (a) straight flight and landings
 - (i) cut out (notched) stringers
 - (ii) mitred stringers
 - (iii) semihoused (built-up) stringers
 - (b) relating to codes
 - (i) product of rise and run
 - (ii) effective depth of stringers
 - (iii) nosing projections
 - (iv) distance between landings
 - (v) handrails, etc.
2. Layout, cutting, assembling or installation procedures
 - (a) review of materials for stairs and landings
 - (b) support or hanging of landings
 - (c) framing square applications
 - (i) unit rise and run
 - (ii) plumb and level cuts
 - (d) attachment — securing of stringers or units to landings
 - (e) surface treatments — coverings
 - (i) nonslip surfaces — nosings
 - (f) alignment — securing of handrails

SECTION TWO:

SHOP

120 Hours

Objectives

The shop operations will relate to items outlined in theory sections. Safety regulations will be observed.

A. Powered Tools and Equipment

6 Hours

1. Shop practices will necessitate introduction of additional powered tools, ie. electric hand plane, router, screw gun, etc. Emphasis will remain with the safe use and versatility of all equipment and tools.
2. Demonstrations and practice with “touch-up” reconditioning
 - (a) saw blades
 - (b) knives, cutters, etc.

B. Wall Framing

18 Hours

1. Demonstration and practice with layout and construction of framed walls and partitions
 - (a) plate layout at various spacing of members
 - (i) corners, intersecting walls
 - (ii) door and window openings
 - (iii) considerations for special units — items
 - frames for pocket doors, bifolds, etc.
 - fireplaces
 - insulation — backing for fixtures, etc.

2. Assembly and sheathing
 - (a) erection and alignment of walls, partitions
3. Layout and installation of ceiling joists
 - (a) butt or lapped
 - (b) ribbons — strong backs
 - (c) integrating parallel partitions
 - (d) backing for finish materials

C. Roof Framing

20 Hours

1. Demonstrations and practice with gable roofs
 - (a) framing square applications
 - (i) pattern common rafter
 - (ii) barge board
— line lengths, plumb and level cuts
 - (b) collar ties
2. Demonstration and practice with light trusses
 - (a) Fink Howe and scissor types
 - (i) high heel trusses
 - (b) typical erection procedures
3. Demonstrations and practice with gable ends
 - (a) built-in-place
 - (b) prefabricated and raised in place
 - (i) nailing strips, backing
4. Demonstrations and practice with cornices
 - (a) soffits and fascias
 - (i) built-in-place
 - (ii) prefabricated and secured in place
 - (iii) auxiliary vents
 - (b) boxed eaves
 - (c) barge boards
5. Demonstrations and practice with a simple shed roof
6. Demonstrations with commonly used roof coverings
 - (a) wood or asphalt shingles

D. Doors

15 Hours

1. Demonstration and practice with fabricating exterior door frame with sill
2. Installation into prepared opening
 - (a) building paper, etc.
3. Hanging of door(s) and installation of lock (latch) set
4. Demonstrations of typical fabrication and installation of other frames and doors
 - (a) pocket — overhead, etc.

E. Wood Stairs **15 Hours**

1. Demonstrations and layout practice for stair stringers in a straight flight
 - (a) cut-out (notched), mitred, built-up
 - (b) use of templates and jigs
2. Cut and assemble stair unit(s)

F. Exterior Finish **12 Hours**

1. Demonstration and practice with wood, metal and vinyl sidings
 - (a) vertical and horizontal applications
 - (i) paper, starting strips, drip caps
 - (ii) installation of window, door units
 - (iii) flashing, sealants, etc.

G. Metal partitions **10 Hours**

1. Demonstration and practice with a typical bearing and nonbearing partition of metal tracks and studs
 - (a) internal bracing
 - (b) access openings
 - (c) installation of frames
2. Demonstration of procedures for application of gypsum wall boards
3. Demonstration of installation procedures for prefabricated partitioning systems
 - (a) ceiling and rail height units

H. Skill Development **24 Hours**

1. Selected projects related to course content for the development and reinforcement of skills and hand and power tools Suggested items:
 - (a) fittings, scribing, coping
 - (b) development of geometric units
 - (c) units with sliding, adjustable components
 - (i) doors, drawers, etc.

SECTION THREE: BLUEPRINTS **32 Hours**

A. A Comprehensive Review of Residential and Light Commercial Blueprints

1. Relating (checking) plans with specifications
 - (a) plan, elevation and section views
2. Reference points for building lines, elevations
3. Study of architecturally designed or customized units for appreciation of special exterior features
 - (a) gable, hip and valley, gambrel and mansard roofs

- (b) dormers
 - (c) flat roof framing
 - (d) window bays, cantilevered units
 - (e) various exterior treatments
 - (i) brick veneer, stucco and siding combinations
 - (ii) panels, battens, etc.
 - (f) entrance (step) treatments
 - (g) landscaping
 - (i) retaining walls, window wells, etc.
4. Consideration for interior finish
 - (a) backing — preparation for future installations
 - (b) access openings
 - (i) ducts, chutes, chimneys, etc.
 5. Assigned problem solving arising from study of blueprints
 6. Formal and freehand drawings of items arising from study of blueprints
 - (a) detailing, clarifying vague or obscure items in plan and section views — specialized terminology
 - (b) developing working drawings for specified shop projects

SECTION FOUR:

TRADE MATHEMATICS

32 Hours

A. This Section of Training is Designed to Permit the Apprentice to Partake in Remedial or Accelerated Exercises at the Discretion of Instructors. Exercises will Relate to the Course Content outlined in blueprint, shop and theory sections.

1. Review of first period
2. Walls and partitions
 - (a) quantities related to plans and specifications
 - (b) door and window openings, etc.
3. Roof framing
 - (a) calculations relating to common rafters — light trusses
 - (i) line lengths
 - (ii) gable ends
 - (iii) quantities — sheathing, shingles, cornice framing, etc.
4. Stairs
 - (a) practice exercises in adjustments to rise and run
 - (i) obtaining head room
 - (b) quantities for specified stairs
5. Exterior finish
 - (a) relating weather exposures of siding according to type and height of walls
 - (b) quantities from study of elevation views, plans
6. Cutting lists for specified projects

- 7. Ratio and Proportion
 - (a) similar triangles
- 8. Mechanical Advantages
 - (a) levers, pulleys, etc.

THIRD PERIOD TECHNICAL TRAINING

SECTION ONE:

THEORY

56 Hours

A. Transit and Builders Level

8 Hours

1. Scope and applications of survey instruments in site and building layout
 - (a) transit
 - (b) builders level
 - (i) accessories
 - rod
 - stick and tape measure, etc.
 - (c) laser equipment
2. Site applications
 - (a) topographical considerations (large site)
 - (i) foresights — backsights
 - (ii) establishing grade levels — reading existing slopes (in degrees)
 - (iii) lines and stakes — perimeters
3. Building layouts and checks
 - (a) transfer of elevations
 - (i) established bench mark and working bench marks
 - (b) locating centres — running lines
 - (i) piles
 - (ii) footings, etc.
 - (c) establishing locations for items on the same plane
 - (i) top of foundations
 - (ii) floor lines, window lines, ceiling heights, etc.
 - (d) vertical checks
 - (i) checking existing adjacent buildings for plumb
 - (ii) vertical checks for wall forms, walls, architectural lines, etc.
 - (e) establishing grades and slopes (in degrees)

B. Concrete

12 Hours

1. Scope within industry
 - (a) architectural and structural
 - (i) cast-(poured)-in-place
 - (ii) precast
 - (b) fire ratings — acoustic values
2. Composition of cements and typical usage
 - (a) normal portland
 - (b) high — early
 - (c) sulphate resistant
 - (d) other additives
 - (i) retarders
 - (ii) accelerators

- (iii) air entrainment
 - (iv) effects on compressive strengths
 - (v) coloring agents
 - (vi) plasticizers
3. Aggregates
 - (a) types and gradation
 - (b) tests — field and laboratory
 - (i) moisture and bulking
 - (ii) organic content
 - (c) special light weights
 4. Concrete design
 - (a) range of compressive strengths
 - (i) typical demands in industry
 - (b) batching by weight and by volume
 - (i) principles of hydration
 - (ii) paste to aggregate ratios
 - (iii) slump tests
 - (iv) design tables
 5. Curing
 - (a) hot and cold weather considerations
 - (i) review of industry practices
 - (b) maintaining moisture for hydration process
 6. Grouts and slurries
 - (a) where used
 - (b) paste to aggregates
 7. Topping finishes
 - (a) where used
 - (b) paste to aggregates
 8. Concrete placement
 - (a) forms — decks
 - (i) consolidation and integration of deposits (lifts)
 - (ii) forces
 - hydrostatic
 - uplift, etc.
 - (b) cause of separation
 - (i) use of chutes, tremies
 9. Establishing elevations
 - (a) reference points
 - (i) screeds, pegs, etc.
 - (ii) tolerances
 10. Form watching during pours
 - (a) precautions
 - (b) critical areas
 11. Surface finishing systems
 - (a) tools and equipment

- (b) rough texture
 - (i) crawl spaces, base for other trades, materials
 - (c) floated and trowelled
 - (i) colored floors
 - (d) nonslip surfaces
 - (i) brushed or rolled
 - (ii) inserts
12. Architectural concrete finish
- (a) accuracy of form work — joint patterns
 - (b) special treatments to columns, walls
 - (i) form liners — inserts for effect
 - water treatments
 - sand blasting
13. Precast concrete
- (a) types — where used
 - (i) pre-tensioned
 - (ii) post-tensioned
 - (b) erection systems for precast units
 - (i) hoisting equipment
 - (ii) bracing systems
 - (iii) connectors — sealants (curtain walls)
 - (iv) combining formed in place and precast units

C. Safety Review

3 Hours

1. A comprehensive review of Occupational Health and Safety Regulations with respect to hazards and dangers encountered on large projects
 - (a) scaffolding systems
 - (b) swing stages
 - (c) site barricades
 - (d) employers — employees responsibilities
2. Review of hazards inherent when material skips and other hoisting-lifting equipment is used on projects
 - (a) hooks, shackles, slings
 - (b) accepted signal systems

D. Reinforced Concrete Construction

9 Hours

1. A review of forces encountered and transmitted during pouring of concrete and the necessary compensations through form design and supports
 - (a) compression
 - (b) tension
 - (c) lateral pressures
 - (d) torque
 - (i) racking — shearing
 - (ii) deflections — distortions
 - (e) safety and legal responsibilities in form design

2. A review of joints used to compensate for built in and natural forces on structures
 - (a) construction joints
 - (b) control joints
 - (c) expansion joints
 - (i) materials and installation systems in forms
 - (ii) sawn-in-place
 - (iii) filters — sealants
 - (d) joints in patterns — architectural features
 - (e) water stops
3. Steel used in reinforced concrete
 - (a) gauges, sizes and condition of welded mesh and bars
 - (b) accessories — types, purpose and installation procedures
 - (i) tie wires, chairs, stirrups, reglets, sleeves, etc.
 - (c) review of reinforcing schedules for footings, lintels, beams, columns, walls, etc.
 - (i) positioning — concrete cover over steel
 - (ii) prefabricated reinforcing units and inserts
 - (iii) beam and column connections
4. Types of form systems — layout and alignment procedures used in reinforced concrete construction
 - (a) typical slab on grad
 - (i) piles — grade beams
— considerations for frost heaving
 - (b) slab stiffeners
 - (c) accommodating other trades
 - (i) heating ducts, sumps, etc.
 - (d) locating and setting anchors, plates
 - (e) considerations prior to concrete placement
 - (i) joints
 - (ii) fill compaction — mesh placement
 - (iii) removal of wood (organic) refuse, etc.
5. Special design footing and wall forms
 - (a) battered
 - (b) multisided
 - (c) curved
 - (i) vertical segments and liners, kerf cuts for short radii
 - (ii) locating — setting anchor bolts
6. Columns

Types — Typical locations in buildings

 - (a) structural, aesthetic
 - (i) light and heavy (built-on-site)
 - (ii) round, regular and irregular
 - (b) form materials
 - (i) wood, fibre
 - (c) typical hardware — accessories
 - (i) clamps, yokes
 - (ii) banding
 - (iii) collars, templates

- (d) design considerations
 - (i) pressures during concrete placement
 - (ii) clean outs
 - (iii) chamfers
 - (e) cutting and assembly procedures
 - (i) establishing column heights
 - (ii) alignment and bracing
 - (f) prefabricated metal forms
 - (i) where used
 - (ii) maintenance
 - (iii) fasteners
7. Beam and slab construction
- (a) shoring systems
 - (i) wood posts, adjustable metal types
 - (ii) mud sills, wedges, bracing
 - (b) column materials and design
 - (i) drop panels
 - (ii) flared capitals
 - (c) typical beam, girder construction
 - (i) spandrel beams
 - (d) slab decks
 - (i) review of span tables
 - (ii) ribbed and waffle systems
 - (iii) flat slabs
 - sleeves, sleepers, etc.
8. Stripping and reshoring procedures
- (a) flying forms for typical levels
9. Special project systems
- (a) slip forms
 - (b) large ganged sections
 - (c) cast on site tilt-up panels
 - (i) steel placement — lift anchors
 - (ii) fabrication — lifting and bracing

F. Concrete Stairs

4 Hours

1. Formed types (monolithic pours)
 - (a) open stringers
 - (b) inverted stringers
 - (c) layout on forms, existing walls
2. Typical forming procedures
 - (a) landings
 - (i) keys — reinforcement, etc.
 - (b) risers and treads
 - (i) sloped risers
 - (ii) bracing systems
 - (iii) reinforcement
 - (iv) concrete placement and curing

- (v) finishing
- (vi) stripping — reusables

3. Precast types
 - (a) lifting and anchoring systems
4. Stair finishes
 - (a) ceramic and resilient tile, epoxies, etc.
 - (b) hand rail considerations

G. Roof Systems

10 Hours

1. Framed roofs
 - (a) a review of gable and shed roof systems and introduction to other systems commonly used
 - (i) regular hip
 - (ii) intersecting roofs of equal pitch
 - (b) materials used — layout procedures
 - (i) ridge boards
 - (ii) common and end common rafters
 - (iii) hip rafters
 - (iv) jack rafters
 - (v) valley rafters
 - (vi) hip-valley rafters
 - (c) other considerations
 - (i) backing for interior materials
— stub ceiling joists, etc.
 - (ii) combining trusses and built in place rafters
 - (iii) roof bracing procedures
 - (iv) soffits and fascias
 - (v) sheathing and roof coverings
 - (vi) venting
2. Review of procedures for other roof systems
 - (a) intersecting roof of unequal pitch
 - (b) semibungalows
 - (c) gambrel and mansard roofs
 - (d) saw tooth roof
 - (e) special features
 - (i) sun porches
 - (ii) dormers, etc.
3. A review of materials and components used in commercial and industrial construction with emphasis on the Carpenter's role
 - (a) roof types
 - (i) flat
 - (ii) domed and vaulted
 - (iii) folded plate
 - (b) joists and connections
 - (i) precast concrete
 - (ii) open web (wood and metal)
 - (iii) structural steel

- (iv) review of decking procedures with various materials
 - precast concrete
 - wood
 - fluted metal
 - manufactured fibre boards
- (c) roof finish systems
 - (i) built up
 - preparations for other trades
 - cant strips
 - insulations

H. Review of Carpenter's Role in the Preparation of Large Structures for Various Treatments or Finishes

6 Hours

1. Furring and backing systems
 - (a) strapping of walls and ceilings — concrete and steel columns and beams
 - (b) dropped ceilings — mechanical concealments
 - (c) sleepers on slabs
 - (d) plaster grounds, etc.
2. Review of finish materials and systems
 - (a) wood, wood substitutes
 - (i) panels, solid and laminated plastics, glass, etc.
 - (b) gypsum products
 - (i) drywall and plastered
 - (c) typical assignments for carpenters
 - (i) installations and incidentals
 - backing and furring
 - storage rooms
 - preparation for other trades, etc.
3. Review of securing systems and the fasteners commonly used
 - (a) wood components to concrete, masonry and metal
 - (b) metal components of wood, masonry and concrete
 - (c) insulation to all types of surfaces
 - (d) finished units — cabinets and other fixtures to various walls and floors
 - (i) carriage, lag and machine bolts
 - (ii) explosive actuated tools (pins)
 - (iii) bands
 - (iv) expansion shields, lead and plastic anchors
 - (v) hollow wall anchors
 - (vi) mastics, etc.
4. Frame setting
 - (a) setting various frames and bucks for masonry and other walls
5. Fire ratings — acoustics
 - (a) an appreciation of designed control systems and the importance that tradesmen play through fidelity to specifications by designers
 - (i) decibels — sound transmission
 - (ii) heat transmission — flame spread

- (b) walls and ceilings that consider or include
 - (i) noncombustible materials
 - (ii) cavities
 - (iii) baffles, etc.
- (c) loss of efficiency due to improper or careless work
 - (i) smoke through minute cracks, openings
 - (ii) sound through cracks, access openings, etc.

I. Timber Construction

4 Hours

1. Review of uses of timber in the construction industry
 - (a) sawn timber
 - (i) piling
 - (ii) heavy trusses
 - (iii) beams, joists, columns, bents, etc.
 - preservatives — treatments
 - relating dimensions to spans
 - typical connectors
2. Glue laminated units
 - (a) structural — aesthetic qualities
 - (i) relating dimensions to spans
 - (ii) typical connectors
3. Review of procedures used in buildings that incorporate timber or glue laminated members combined with other materials i.e. masonry
 - (a) erection on prepared footings — foundation walls
 - (i) lifting equipment
 - (ii) anchors, connectors
 - (iii) precautions against stains, bruises, etc.
 - (b) open beam interiors
 - (i) box beams
 - (ii) exterior treatments
 - tails — open or boxed
 - (iii) roof decks
 - insulations
4. Heavy arch ribs
 - (a) battered foundation walls
 - (b) lifting, anchoring systems
5. Heavy trusses
 - (a) types, where used
 - (b) study of web arrangements
 - (i) joints, connectors
 - (ii) purlines
 - (iii) knee braces, bents
 - (c) lifting — bracing procedures
 - (i) decking — roofing considerations

SECTION TWO:**SHOP****120 Hours****Objectives:**

Shop operations will relate to items outlined in theory sections. Safety regulations will be observed.

A. Building Layout**18 Hours**

1. Set up and practice with transit and builders levels
 - (a) back sights and foresights
 - (b) levels
 - (c) verticals
 - (d) straight lines
 - (e) angles
2. Practice layout
 - (a) from established reference points
 - (i) transfer of elevations
 - (b) building lines
 - (i) batter boards
 - (ii) excavation lines
 - (c) location and placements for building components
 - (i) pilings, footings, etc.
3. Demonstrations in setup and use of laser equipment

B. Formwork**33 Hours**

1. Shop assignments in development of selected forms and participation in a forming system typical in industry.

Suggested items:
Demonstrations and practice with forming basic columns

 - (a) various clamps, banding
 - (b) chamfer strips
 - (c) collars, templates
 - (i) alignment, bracing procedures
 - (d) column with flared capitol
 - (e) column with haunch
 - (f) geometric (multisided) column or forms
 - (g) beam and slab
 - (h) flat slab
 - (i) bracing systems
 - (ii) demonstration of procedures for placements for installations
 - metal pans
 - reinforcement
 - concrete
 - (i) form watching during pours
 - (i) critical areas of forms

C. Concrete Stairs**15 Hours**

1. Participation in development of stair project(s)
 - (a) landing

- (b) inverted or open stringers
- (c) sloped risers
- (d) bracing systems

D. Roof Framing

24 Hours

1. Practice with layout and erection of roofs that include hip and valley rafters
 - (a) ridge boards
 - (b) framing square applications
 - (i) hip
 - (ii) valley
 - (iii) jack rafters, etc.

E. Skill Development Projects

30 Hours

Objectives:

Demonstrations and practice with materials and components related to building exteriors and interiors

1. Fasteners and anchors
 - (a) toggle bolts, molly screws
 - (b) expansion shields, screw shields
 - (c) nylon and plastic grips and anchors
 - (d) rings, plates used in timber construction, etc.
2. Selected projects that emphasize skill and knowledge required for on-site finishing work. Suggested items:
 - (a) matching of wood grains
 - (i) veneers and plywoods
 - (ii) solid woods
 - (iii) glues
 - (iv) clamps
 - (b) use of wood substitutes
 - (i) plastic laminates, solid plastics, glass, etc.
 - (ii) cutting and application
 - (c) adjustable or movable components
 - (i) door, drawers, shelves, etc.
3. Development of geometric units
 - (a) obtuse and acute angles
 - (i) compound mitres
4. Exercises that demonstrate versatility of commonly used powered tools
 - (a) development of jigs, templates
 - (i) planing, rabbetting, profiling, etc.

SECTION THREE:

BLUEPRINTS

32 Hours

A. Study of Blueprints for Structures that are Substantially of Reinforced Concrete.

1. Site
 - (a) orientation, elevations, etc.

2. Grade slab plans
 - (a) sections and details
3. Foundation plans
 - (a) pilings, footings, etc.
4. Section views through typical levels
5. Study of details
 - (a) exterior elevation views
 - (b) wall, entrance treatments, etc.
 - (c) shop drawings
6. Floor plans
 - (a) room layouts, doors and window locations, etc.
7. Interior considerations
 - (a) elevations, sections and details
 - (b) ceilings — reflected views, details
 - (c) room finish schedules

B. Study of Plans and Details of Buildings that Include Glue-Laminated and Other Timber Components

1. Truss design
 - (a) web arrangements — purlins
 - (b) connectors
2. Glue-laminated beams, ribs
 - (a) spacings, connectors
 - (i) exposed, enclosed
 - (ii) interior and exterior treatments

C. Drawing Assignments Related to Study of Blueprints

1. Detailing and dimensioning obscure items on plans.
2. Drawings for assigned shop projects
3. Quick drawings suitable for communication on job site

SECTION FOUR:

TRADE MATHEMATICS

32 Hours

A. This section of Training is Designed to Permit the Apprentice to Partake in Remedial or Accelerated Exercises at the Discretion of Instructors. Exercises will Relate to Course Content Outlined in Blueprint, Shop and Theory Sections.

1. Concrete
 - (a) volumes related to plans and specifications
 - (b) batch design to various yields and strengths
2. Building layout
 - (a) practice exercises related to instruments
 - (i) elevations, grades, etc.

- (b) building lines from reference points
 - (i) volumes for earth removal, fill, etc.
- 3. Formwork
 - (a) calculations for material quantities and cutting lists related to study of plans, blueprints
 - (b) calculations for spacing and layout of anchor bolts
- 4. Concrete stairs
 - (a) practice exercises related to unit rise and run
 - (b) forming materials, concrete volumes, etc.
- 5. Roof framing
 - (a) calculations relating to layout of hip and valley roof systems
 - (i) material quantities
 - (ii) line lengths, etc.
- 6. Finish work
 - (a) cutting lists — material quantities
 - (i) wall coverings, storage units, trim, doors, hardware, etc.
- 7. Introduction to costing
 - (a) labour factors
 - (b) maximum usage in material break-out

FOURTH PERIOD TECHNICAL TRAINING

SECTION ONE:

THEORY

48 Hours

A. Exteriors and Interiors of Buildings

16 Hours

1. A review of typical exterior treatments for a variety of commercial buildings. Examples:
 - (a) motels
 - (b) apartment complexes
 - (c) shopping centres
2. Review of procedures for various systems with emphasis on the carpenters' role
 - (a) entrance, door and window treatments, fences, etc.
 - (b) roof considerations
 - (i) mansard concepts
 - (ii) parapet walls, etc.
 - (iii) sealants, flashings
 - (c) preparations for other trades
 - (i) furrings, ledgers, footings
 - (ii) arches, etc.
3. A review of interior finish materials — handling and storage procedures
 - (a) effects of high humidity levels on various types
 - (i) pre-expansion (climatization) for specified materials
 - (b) allocation — distribution or storage on job site
 - (i) considerations of weight and point loading
 - (ii) accessibility to materials to expedite work assignments
 - (c) causes of stains, discoloration to wood and other materials
 - (i) poor housekeeping
 - (ii) mortars, gypsum droppings
 - (iii) sunlight, moisture, etc.
 - (iv) protective coverings
 - (d) demonstrations how flaws are highlighted or obscured under various stains, flat or gloss wood finishes
 - (i) repairing minor defects prior to woodfinishing
 - (ii) repairing minor defects on finished surfaces
4. Review of interior systems and installation procedures
 - (a) gypsum wall finishes
 - (i) selection and spacing of nails and screws — causes of "nail" popping
 - (ii) laminated systems — strip and backing boards — adhesives
 - (iii) bending of gypsum sheets — moisture and kerfed systems
 - (b) plaster on gypsum and metal lath
 - (i) wood grounds
 - (ii) curing times

- (c) ceiling tiles
 - (i) acoustic — decorative types
 - nailed or stapled to strapping
 - adhesive applied on backing boards
 - (d) prefabricated partitions
 - (i) panels of various textures and finishes
 - (e) suspended ceilings
 - (i) concealed, semiconcealed and exposed T systems
 - (ii) levelling, carrying and bracing systems
 - (iii) grid layouts for regular and irregular areas
 - (iv) provisions for dropped or stepped ceilings
5. Wood panels
 - (a) selection for grain and colour
 - (b) layouts
 - (i) minimizing or accentuating mouldings
 - (ii) provisions for electric outlets — other openings
 - (iii) nail or screw-on systems
 - (iv) adhesives
 - (v) valances, etc.
 6. Review of procedures for other wood finishes for walls, ceilings and floors
 - (a) vertical and horizontal strips, frame and panels, etc.
 - (b) strip and parquet flooring
 7. Review of trim components and systems for various finishes
 - (a) wood, metal, plastic
 - (i) external and internal corners, etc.
 8. Storage compartments, rooms
 - (a) shelves
 - (i) spacing, spans, supports
 - (ii) racks, bars, etc.
 9. Installation of prefabricated door units, walls, cabinets, etc.
 - (a) to specifications or to options
 - (i) light and heavy traffic and usage
 - (b) installation procedures for cabinets
 - (i) straightening — furring of crooked walls
 - (ii) scribing — shimming points to balance doors
 - (iii) mouldings, covers for finished appearance
 - (iv) selection of fasteners
 10. Review of procedures for selected items arising from study of drawings and in-class discussions. Examples:
 - (a) concepts within Modern-Contemporary, Colonial and Provincial designs
 - (b) hardware, joint and material selection
 - (c) proportion and balance
 - (i) screens, dividers, etc.

- (d) anatomy to fixtures
 - (i) cabinets, counters, etc.
- (e) curved, geometric units
 - (i) use of full scale layouts

B. Energy Efficient Construction

10 Hours

1. Introduction

- (a) explain the "prairie approach"
 - (i) history of low energy housing and advances in concept and technology
 - (ii) deal with active solar as a transition technology, no longer appropriate for space conditioning on the prairies.

2. Energy demand

- (a) energy lost from a structure
 - (i) infiltration losses
 - (ii) insulation losses

3. Reducing air leakage of air/vapour barrier

- (a) explain functions of the plastic barrier
- (b) explain need for mechanical ventilation
- (c) critical air-leakage locations
 - (i) basement
 - (ii) framing
 - (iii) mechanical
- (d) caulking and stapling
- (e) acoustical sealant
- (f) weatherstripping
- (g) air-locks

4. Insulation materials

- (a) board
- (b) loose fill
- (c) batt
- (d) foam
- (e) foil
- (f) RSI values
- (g) movable insulation

5. Wall configurations

- (a) double wall
- (b) 38 × 140 wall plus insulating sheathing
- (c) 38 × 89 wall plus horizontal interior strapping
- (d) staggered stud wall
- (e) truss wall
- (f) hybrid systems
- (g) cross-bracing requirements
- (h) economics
 - (i) payback
 - (ii) cost benefit
 - (iii) life cycle

- (iv) reference costs
 - (v) grants, subsidy and incentive programs
6. Ceiling & roofs
 - (a) cathedral roofs
 - (b) sloped roofs
 - (c) special considerations
 7. Passive solar
 - (a) insulation
 - (i) energy from sunlight
 - (ii) south windows as a solar collector
 - (iii) need for good design and siting
 - (b) shading control
 - (i) overhang design
 - (ii) shading
 - (c) thermal storage
 - (d) rules of thumb for sizing storage systems
 - (e) greenhouse, sunspace alternatives
 8. General
 - (a) discussion on conservation and alternate energy supply
 - (b) earth berming
 - (c) setback thermostats
 - (d) triple and quadruple glazing
 - (e) heat pumps
 - (f) wood stoves
 - (g) air-to-air heat exchangers

C. Renovations and Building Additions

6 Hours

1. Typical procedures and problems encountered in extending and/or adding additional storeys to existing buildings
 - (a) plumb, square and alignment checks
 - (i) extending building lines
 - (ii) check for existing services
 - (b) excavation
 - (i) earth removal — material flow
 - (ii) minimizing damage to existing landscaping
 - (iii) underpinning existing adjacent footings, walls
 - (c) footings — foundation walls
 - (i) connections to existing concrete, masonry, etc.
 - (ii) access openings through existing concrete
 - (iii) shoring, bucks, frames
 - (d) weather protection systems
 - (i) penetrated (opened) exterior walls
 - (ii) roofs
2. Renovating interiors
 - (a) precautions — disconnections of utilities
 - (b) precautions in renovating occupied buildings
 - (c) protection of existing floors, cabinets, etc.

- (d) removal of old material
 - (i) salvage or discard
- (e) typical sequence of work stages
 - (i) relating to other trades

D. Stairs

6 Hours

1. A review of previous stair systems and the introduction to other types
 - (a) household stair units
 - (i) templates
 - (ii) balustrades
 - (iii) attachment to landings
 - adaptation to finish floors, bases, etc.
 - (b) winding stairs
 - (i) where used — limitations
 - (ii) layout and assembly
 - (c) circular, spiral stairs of wood and concrete
 - (i) where used
 - (ii) layout of forming systems
 - (iii) layout and assembly of wood

E. Project Organization

6 Hours

1. Review of the roles of architects, engineers, contractors, subcontractors and local authorities
2. Job scheduling
 - (a) relating to a critical path method
 - (i) bar charts
 - (ii) other trades
3. Material organization
 - (a) lead time for procurements
 - (b) sequence for delivery — accommodation on site
 - (i) considerations for long or wide components
 - (ii) distribution of weights on various slabs, levels
 - (iii) access to materials
 - (iv) protection from weather
 - (v) security
4. Review of job safety with emphasis on
 - (a) safety committees structure
 - (b) industrial health hazards — illnesses
 - (c) inspections

F. Individual Concerns

4 Hours

1. The carpenter's role — job attitude
 - (a) as a tradesman — craftsman or specialist in developing technologies
 - (b) adjustments based on background and experience
 - (c) opportunities for continued upgrading

2. The apprentice may wish to review or expand on specific trade matters within the industry. Concerns and needs may differ with individual apprentices and studies remain at the discretion and under the direction of instructors. Some suggested items are:
 - (a) forming systems
 - (b) site and building layout
 - (c) quantity survey
 - (d) blueprint study and interpretation, etc.

SECTION TWO:

SHOP

112 Hours

Shop assignments will relate to items in theory sections. Precise workmanship will be emphasized. Safety regulations will be observed.

A. Stairs

20 Hours

1. Participation in layout, cutting and assembly of stair systems
 - (a) housed stringers and balustrade
 - (i) mitred and housed stringers
 - (b) winding stairs
 - (c) circular stairs
 - (i) circular stair form

Note: Apprentices will be instructed through assignments within various systems. It is not intended that every apprentice build each type.

B. Exterior and Interior Finish

30 Hours

1. Selected projects that incorporate precise skills and layout techniques and a range of materials that include wood substitutes.
Suggested items:
 - (a) built-on-site cabinets or other units
 - (i) screens, dividers, storage units, etc.
 - (b) development of sloping — irregular shapes
 - (i) displays for store interiors
 - (ii) architectural features on building exteriors
 - (iii) alcoves, arches
 - (iv) decorative louvred panels for windows, etc.
 - (c) panel work for interiors
 - (i) mouldings, battens, valances, etc.
 - (d) jigs, templates for specified operations
 - (i) full scale layouts
 - (e) installation of a range of hardware
 - (i) concealed hinges
 - (ii) door closers
 - (iii) sliding hardware
 - (iv) lock-latch sets, etc.

C. Energy Efficient Construction

8 Hours

1. Air/vapour barrier
 - (a) install as per energy efficient standards
 - (b) tools, clothing, safety

- (c) materials, film, foil, paints
- (d) sealants
- (e) polypens, vapour hats, beam bags

2. Air leakage

- (a) beams set in concrete
- (b) air leakage at floor joists
- (c) vapour barrier installation at top plates
- (d) door and window installation
- (e) attic hatch construction
- (f) cantilever treatment for airtightness
- (g) mechanical ventilation from an airtight structure

3. The building shell

- (a) subtrade coordination
- (b) "rule of thumb" procedures

4. Trusses

- (a) manufacture of high heeled truss
- (b) scissor truss

D. Individual Concerns

32 Hours

1. This section is intended for reinforcement of skills and knowledge in layout and development procedures. Concerns and needs may vary with individual apprentices. All matters remain at the discretion and under the direction of instructors. Suggested items:

- (a) cabinets or fixtures
- (b) roof layout
- (c) site layout
- (d) stair work
- (e) geometric layout, etc.

E. Practical Examination

22 Hours

1. Every apprentice will be required to build an in shop practical project. This project will be assessed by representatives from industry and the marks obtained will be a major consideration in awarding completion of apprenticeship and journeyman status.

SECTION THREE:

BLUEPRINTS

56 Hours

A. A Comprehensive Review of Blueprints and Specifications

1. Review of interior and exterior treatments for commercial buildings
 - (a) a review of typical dropped ceilings, furred walls
 - (i) sections for mechanical concealment
 - (b) study of various elevations and sections for appreciation of exterior treatments
 - (c) study of room finish schedules, plan, elevation and reflected views for appreciation of interior treatments

- (d) study of working drawings and exploded views of various interior units
 - (i) stairs
 - (ii) storage units
 - (iii) dividers, valances, etc.
 - (e) determination of ambiguous or arbitrary sections that may be encountered when interpreting plans and specifications
2. A review of blueprints for structures other than buildings for appreciation of scope of the carpenter trade
 3. A review of sequence of procedures for a project or building from start to finish through the study of blueprints.
 - (a) acceptable determinations for typical and unusual job problems arising from the study and from in-class concerns
 4. Formal and freehand drawings
 - (a) plan and pictorial drawings related to design concepts
 - (i) interior units
 - (b) quick drawings suitable for communication within the industry. Examples:
 - (i) to an operator of a radial arm saw
 - (ii) clarification of procedures with a supervisor
 - (iii) clarification of design and procedure with a customer
 - (c) assigned drawings, cutting lists for shop projects

SECTION FOUR:

TRADE MATHEMATICS

24 Hours

A. This section of Training is Designed to Permit the Apprentice to Partake in Remedial or Accelerated Exercises at the Discretion of Instructors.

1. Stairs
 - (a) layout — rise and run, headroom
 - (b) tread calculations in circular types
 - (c) materials — cutting lists
2. Quantity take-off from blueprints, drawings
 - (a) interior components, systems
 - (i) wall, ceiling and floor surfaces
 - (ii) components — doors, hardware, etc.
 - (iii) cutting lists for storage rooms or units
 - (b) practice exercises in selecting materials to minimize waste
 - (i) sheets, yardage, dimensioned materials
 - (ii) trim or finish components, etc.
3. Costing
 - (a) exercises that include material, labour, equipment rentals and variables such as weather, work stoppages, etc.
4. Review of calculations for layout procedures in all years of training
 - (a) site
 - (b) geometrics
 - (i) anchor bolts

SUGGESTED REFERENCE MATERIALS

Carpentry and Building Construction — S.I. Metric Edition — Feirer, Hutchings and Wilson (Copp Clark Pitman)

Principles and Practices of Heavy Construction — R.C. Smith

National Building Code (National Research Council of Canada)

A Glossary of Building Terms (Central Mortgage and Housing Corporation)

Metric Roof Framing — P.H. Frederickson

Construction Metric Guide — Domtar Construction Materials
P.O. Box 6138 Montreal, Quebec

Energy Efficient Housing — A Prairie Approach

Canadian Wood Frame Construction (Central Mortgage and Housing Corporation)

TECHNICAL TRAINING SCHOOLS

The Carpenter apprenticeship training program is offered by the Alberta Manpower, Apprenticeship and Trade Certification Division. Staff and facilities for teaching the program are supplied by Alberta Manpower at:

1. Northern Alberta Institute of Technology
2. Southern Alberta Institute of Technology
3. Lethbridge Community College
4. Keyano College
5. Lakeland College
6. Fairview College
7. Medicine Hat College
8. Red Deer College

LOCATION OF APPRENTICESHIP AND TRADE CERTIFICATION DIVISION REGIONAL OFFICES

CALGARY

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GRANDE PRAIRIE

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LETHBRIDGE

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